School of Energy Science and Engineering

Indian Institute of Technology Guwahati

Placement Brochure 2023-24

Welcome Message

Message from HOD

Welcome to the School of Energy Science and Engineering!

We, at IIT Guwahati, are committed to protect both the people and the environment while utilizing the resources and simultaneously contributing towards energy security as well as economic development. The school houses an excellent milieu of able faculties, state-of-the art laboratories and a good number of meritorious students coming from interdisciplinary engineering backgrounds working on various aspects of energy research. The alumni of this School have proven their competence by excelling in some of the most competitive environments around the globe.

As the Head of School, I proudly present the current final year batch to all potential recruiters. Our past recruiters are already familiar with the high standards our alumni have set. For new recruiters, we are confident that the excellence of the current batch will catalyze the beginning of a long and prosperous relationship with IIT-Guwahati.

-Prof. Dr. V.V. Goud

Message from Director

IIT Guwahati is proud to extend the frontier of School of Energy Science and Engineering.

SESE envisions to promote a proactive role in outreach activities, industry-academia collaboration, technology incubation & transfer, grass root level skill development and a thorough understanding of regulatory and political aspects of energy supply. My strong belief that the proposed multidisciplinary structure envisioned by the school is truly an amalgamation of teaching and real-world experience in energy system implementation and analysis, as well as resource generation for meeting the present needs regionally, nationally and globally.

We bring forth an effective implementation of Sustainable Development Goals that necessitates commercialization of energy efficient technologies along with grass root awareness, implementation of community based projects and partnership with industry and Govt./Non govt. think tanks.

- Prof. Parameswar K. Iyer

About the School

Energy can’t be created or destroyed, but it can be transformed into a sustainable future!

School of Energy Science and Engineering (formerly, Centre for Energy) at IIT Guwahati was established in May, 2004 to promote multidisciplinary activities focused to various facets of energy technology and systems in the form of research, teaching and consultancy. Looking into the potential and application of different energy resources from the north eastern region of India, it is emphasized that the School gives priority to activities in the field of bio-energy, small hydro-power, alternative fuels, clean coal technology, combustion and energy efficiency of systems etc. The research activities in the School are in the form of funded projects from various national and international funding agencies. The School currently has 5 dedicated faculty members from various educational and research backgrounds. Besides them, faculty members from various departments of the institute such as Civil Engineering, Design, Electronics and Electrical Engineering, Mechanical Engineering, Biosciences and Bioengineering, Chemical Engineering and Physics are associated with the School for the promotion of interdisciplinary research for sustainable energy. To support the research work in the projects, the School has two academic programmes - Doctor of Philosophy (PhD) and Master of Science by Research (MS-R). Moreover, a new Bachelors programme (B.Tech. in Energy Engineering) has been started by the School from 2022 looking into the current demand for professionals in the field of Energy. The facilities available at the School have been a great support for the students working in different areas at IITG as well for the students of various academic and research institutions of the North East.

Programmes Offered

MS(R)

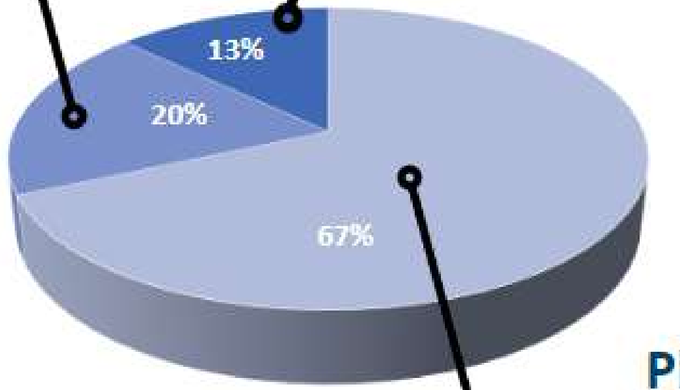
A Postgraduate programme to offer a flexible and interdisciplinary approach enabling engineers to develop a broader perspective while advancing in their disciplines and applying critical thinking abilities of their domains to create sustainable energy solutions and it's applications.

DURATION : 2-years

B. Tech

An Undergraduate programme to create a new set of young engineers who are well equipped with the integrated knowledge of multiple-disciplines and skills to be at the forefront of the global transition to a sustainable energy future.

DURATION : 4-years



PhD

A terminal degree programme that shapes individuals into experts, critical thinkers, and lifelong learners. The skills and attributes developed empower them to make significant contributions to their profession, real world challenges and society at large.

DURATION: 5-7 yrs

ABOUT MS(R) PROGRAMME

- It is exclusively for **engineering graduates** who are selected through a valid **GATE score** in their engineering domain.
- MS(R) is a new programme and **not an alternative to M.Sc. degree**
- It is **similar to MTech** except in terms of credits of course work and project.
- MS(R) Program gives more weightage to identifying key problems and application based learning by giving **more credits to project work.**
- **MS(R) Programme at IIT Guwahati is a 2 Year Programme**

MTech: 2 years (4 Semesters)
1 & 2 Sem: coursework
3 & 4 Sem: Project

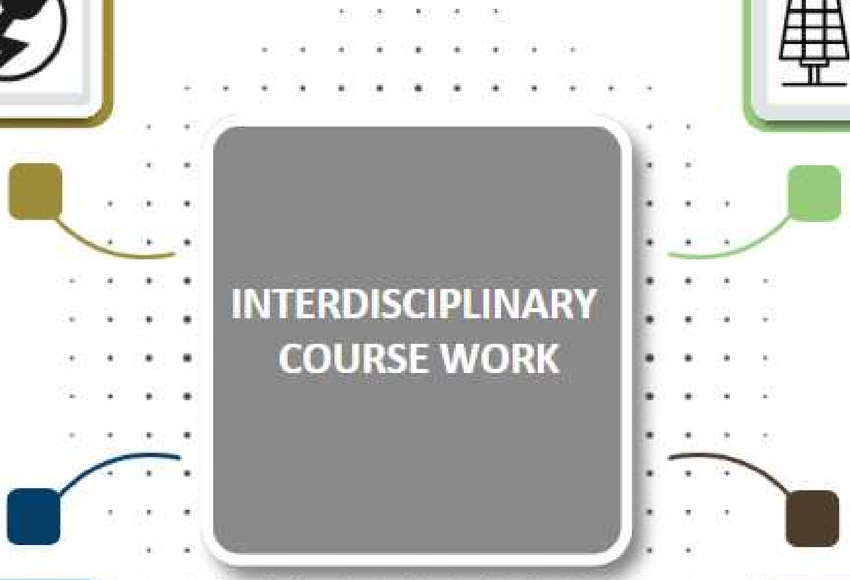
MS(R): 2 years (4 Semesters)
1 sem: coursework
2 sem: Project and related coursework
3 & 4 sem: Project work

Course Work

MSR students at School of Energy Science and Engineering go through two semesters of mandatory course work with a mixture of compulsory courses and elective courses according to their research area.

ELECTRICAL

- Power Electronics for Electrical Vehicles
- Power Electronics for Renewable Energy systems
- Power Electronics converters
- Electrical Machines and Drive systems
- Insulation and High voltage Engineering



ENERGY

- Fundamentals of Energy Engineering
- Renewable Energy Systems
- Distributed Energy Resources in Electric Grid
- Energy Storage Systems
- Energy Economics, Planning and Management
- Advance Fuel Cell Technology
- Solar Energy Conversion Technology
- Energy Resources
- Operation and Instrumentation (Lab)

MECHANICAL

- Advance Energy System
- Advance Thermodynamics
- Conduction and Radiation
- Convective Heat Transfer
- Computational Fluid Dynamics

OTHER

- Research Methodology
- Introduction to Machine Learning
- Composite Materials
- C-Based VLSI
- Data Structures and Algorithms

Please find detailed list of courses and the Syllabus here.

Research Areas

Electrical

- Electrical Vehicle charging
- Microgrid
- Wireless power transfer
- Distributed Energy Resources
- Control of Power Electronics circuits
- Battery management system

Mechanical

- Thermal Management of systems
- Solar dryers design
- Wind hub/rotor design
- Solar PVT
- Hydrogen storage and compression

Chemical

- Electrolyzer
- Fuel cells
- Batteries
- Green Hydrogen production
- Alternate fuels
- Wastewater Treatment
- Carbon Sequestration

Energy

- Numerical modelling of energy systems
- Energy Efficiency
- Exergo-Economic Analysis
- Energy storage
- Process Optimisation
- Energy Management

ENERGY RESEARCH

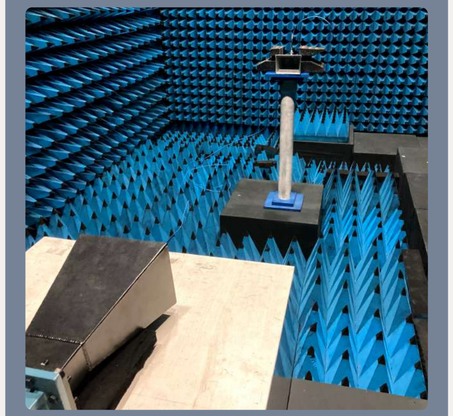
Student Projects

Project Details of MS(R) Batch 2022-24

Project Title	Domain
Development and Validation of Efficient Dynamic **Reserve Power Point Tracking for Grid connected Solar Photovoltaic System**	
Design of an efficient single-phase power factor correction rectifier with active power decoupling for **on-board charger in Electric Vehicle**	
Thermal management of car cabin using a novel phase change material	
Design of **Battery Thermal Management System** for a sub-module at high temperature, high discharge condition	
Design and testing of **multi-rotor system using small-scale horizontal axis wind turbine** for low tip-speed ratio applications	
Numerical modelling and experimental study for **thermal conductivity enhancement** using compacts in **metal hydride hydrogen compressor**	
Analysis of **non-symmetrical airfoil** characteristics at low reynolds number	
Thermodynamic Analysis and Life Cycle Assessment of a **biomass based multigeneration system**	
Isothermal Solar Drying of agricultural spices found in North-East India using a forced convection mixed mode solar dryer	
Design and Development of a novel photoelectrochemical Anion exchange membrane **water electrolyser for green hydrogen production.**	
Design and Development of molten salt reactor for **electrolytic ammonia synthesis**	
Thermodynamic, economic & life cycle assessment of photo electrochemical based **anion exchange membrane water electrolysers**	
Synthesis and analysis of (Co,Cu)-codoped NiSex for **electrochemical hydrogen evolution**	
Synthesis and analysis of CoSex encapsulated MOF for **electrochemical hydrogen evolution**,Design and analysis of **ammonia reactor for hydrogen carrier**	

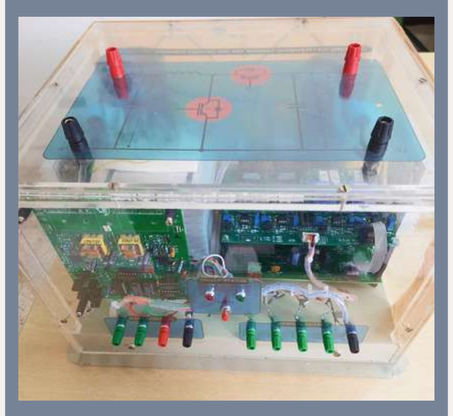
Electrical Mechanical Chemical Renewable

Research Facilities



Anechoic Chamber

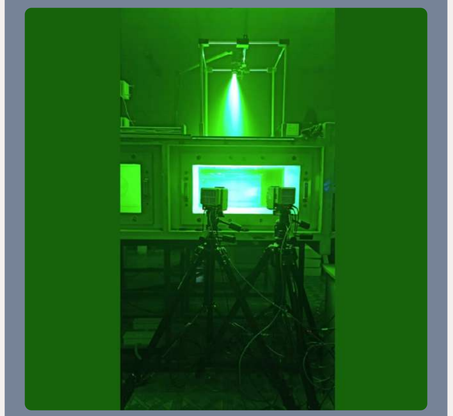
*Battery Tester and DA**



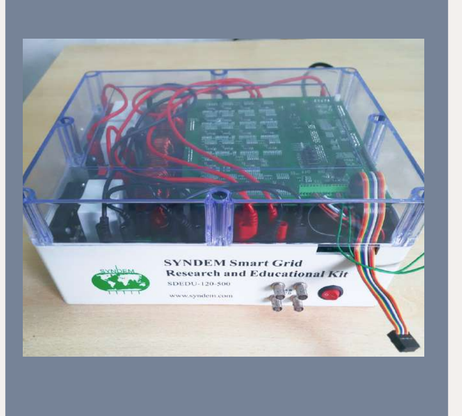
Bi-directional converter

Hydrogen storage and purification system

Wind Tunnel



*PIV**



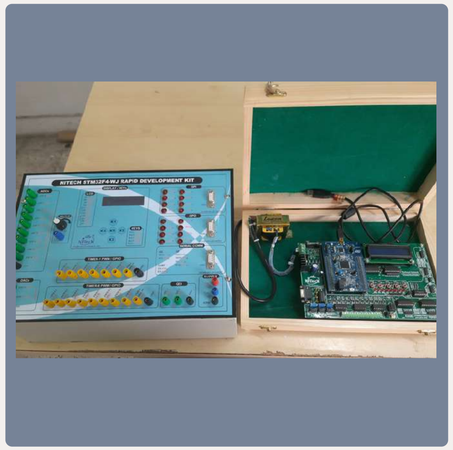
Smart Grid kit

MPPT Boost converter

Research Facilities

Thermal Evaporator

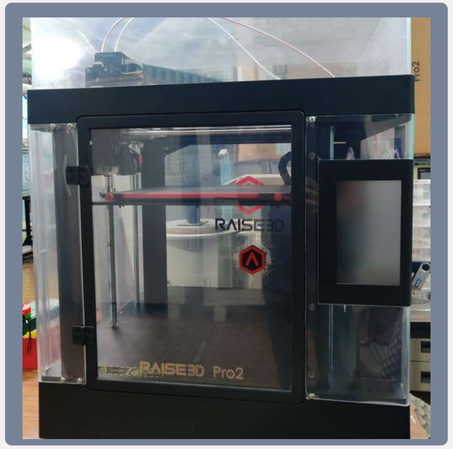
IC Engine Lab



Power Electronics controller

Thermogravimetry analysis

*Battery module for TMS**



3D Printer

Solar Simulator

Digital Signal Oscilloscope

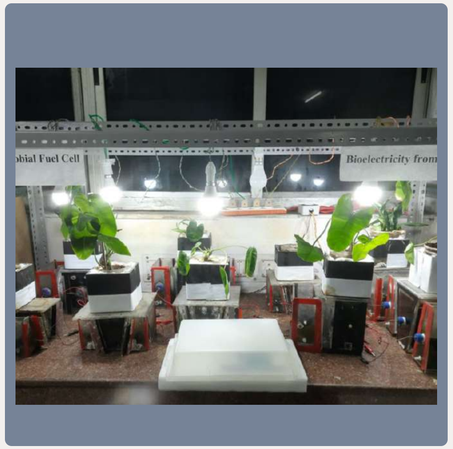
Research Facilities

High Temperature conductivity measurement

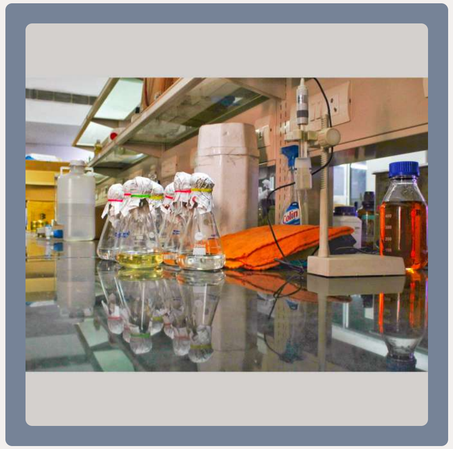
Flash Point Apparatus

Pyrolyzer

Gas Chromatography



Plant Microbial fuel cell



Bio Fuel Lab

Biomass Gasifier

***Abbreviations**

PIV- Particle Image Velocimetry
DA- Data Acquisition
TMS- Thermal Management System

Recruiters

And You...

Contact Details

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